

REMARKS

The final Office Action has been reviewed and the Examiner's comments carefully considered. Claims 9 and 15-18 are pending in this application. Independent claim 9 has been amended to recite that "each heat-conducting element is a flexible metallic sheet". Support for the amendment can be found, for example, in Figs. 1 and 2 and page 5, line 28 to page 6, line 29 of the specification. Claim 19 has been newly added. Claims 9 and 15-19 will be pending upon entry of this Amendment. No new matter has been added.

Rejections Under 35 U.S.C. §103:

Claims 9 and 15-18 stand rejected under 35 U.S.C. §103(a) as being obvious over United States Patent No. 4,440,156 to Takeuchi et al. (hereinafter "Takeuchi"), in view of German Patent Application Publication No. DE 19859658 to Helmut et al. (hereinafter "Helmut"), and United States Patent No. 6,619,283 to Ghela (hereinafter "Ghela").

With regard to independent claim 9, the Office Action asserts that Takeuchi teaches or suggests most of the limitations, with the exception of (1) a plurality of heat exchangers, with each heat exchanger having a fluid-conducting pipe system connected to a manifold; (2) a spiral shaped heat-conducting element; (3) a fluid-conducting pipe system centered concentric to the vacuum tube; and (4) attachment of the heat-conducting element to the outer wall of the fluid-conducting pipe system.

The first missing limitation is asserted to be a) disclosed by Helmut and/or b) well-known. Applicant respectfully disagrees. Helmut discloses a single solar collector and a plurality of embodiments for an absorber to be used with the single solar collector. Moreover, Helmut fails to disclose whether its plurality of solar collectors, assuming Helmut actually disclosed them, are connected to a single manifold or a plurality of manifolds. Additionally, it is noted in section 9 of the Office Action that solar collectors having a plurality of heat exchanging units, such as an array, are well known in the art. However, the Office Action fails to provide any reference that discloses such an arrangement. Even if it is assumed, *arguendo*, that such an arrangement is known, the Office Action fails to provide a single reference where a plurality of heat exchanging units are coupled to a single manifold as opposed to multiple manifolds. Accordingly, Applicant submits that none of the prior art of record teaches or suggests a plurality of heat exchangers, with each heat exchanger having a fluid-conducting pipe system connected

to a manifold.

Helmut is asserted to teach the second and third missing limitations. More specifically, the Office Action asserts that Fig. 2a in Helmut shows an absorber (3) that extends in a spiral shape to cover an angle of at least 450° while keeping the pipe (13) concentric with the vacuum tube (2). Ghela is asserted to teach the last missing limitation. Resilient attachment of the vacuum tube to the distributor frame via the pre-stressed heat-conducting element is asserted to be inherent in the combination of Takeuchi and Helmut. Applicant respectfully disagrees that the proposed combination of references teaches or renders obvious the claimed solar collector, as recited in independent claim 9.

One of the advantages of the claimed solar collector structure is that the inner fluid-conducting pipe system with the connected heat-conducting elements can be introduced into the vacuum tube without exerting any pressure on the surrounding delicate glass tube. The spiral of the heat-conducting elements, i.e., the baffles, can be rotated in advance before introduction into the glass tube (as is done, for example, with a poster to be introduced into a cylindrical transport box) and, thus, the metallic baffle will not generate scratches at the inner wall of the glass vacuum tube and the device can be introduced into the vacuum tube without pressure. Because the baffles can be maintained, rolled and aligned against the inner fluid-conducting pipe system, the entire assembly can be inserted into the glass vacuum tube without the possibility of scratching the inner tube wall. Further, because the absorbent coating is provided on the outside of the glass vacuum tube, there is no possibility that the absorbent coating will be scratched during the introduction of the baffles and the inner fluid-conducting pipe system into the glass vacuum tube.

On the other hand, none of these advantages can be realized with the systems taught in Takeuchi or Helmut, individually or in combination. Takeuchi discloses a U-shaped pipe where the free ends of the pipe extend out of the open bottom end of the glass tube. The heat-conducting members (7, 8) which envelop the pipe cannot be inserted into the glass tube without maintaining a firm contact with the inner wall of the glass tube (see column 3, lines 10-23).

Helmut provides a general embodiment in Fig. 1 and then discloses a series of Figs. 2a to 2f which are intended to illustrate alternate embodiments of the heat-conducting

elements. However, the spiral shape of the baffle shown in Fig. 2a as the other embodiments is only loosely provided in this space. Elements (29) (such as pins or knobs shown in Figs. 2a and 2e), are intended to maintain the contact with the inner and outer cylindrical surfaces. These elements would provide initial pressure on the glass tube as the baffle is introduced into the glass tube.

Even in the absence of these elements, Helmut fails to teach or suggest the structure of the heat-conducting element of the claimed invention when combined with Takeuchi and/or Ghela. The Office Action submits that it would have been obvious to modify Takeuchi's U-shaped pipe with Helmut's counterflow arrangement to increase heat exchange surface area, which would cause an increase in system efficiency. Applicant disagrees with this assertion. Takeuchi is expressly directed toward a solar collector having a U-shape pipe and a corresponding heat-conducting member adapted specifically to suit the shape of the pipe. Changing Takeuchi's U-shaped pipe with Helmut's counterflow arrangement would be incompatible with Takeuchi's heat-conducting member, which is the essence of Takeuchi's invention.

With regard to Ghela, it is asserted that Ghela's heat-conducting elements (72) are attached to unitary inner tube (71). While this is not an incorrect statement, one of ordinary skill in the art would not be inclined to modify Takeuchi or Helmut in the proposed manner. The system shown in Fig. 15 of Ghela does not have an outer glass tube that is separate from the inner metallic fluid-conducting pipe system. Ghela teaches away from the combination of Takeuchi and Helmut because it provides for an inner tube, outer tube, and the baffle connecting the two to be of the same material in a single, unitary structure. As described on page 6, lines 24-29 of the present specification, it is not desirable to have fixed baffle because of undesirable stress effects caused during thermal expansion. Independent claim 9 has been amended to recite that the claimed heat-conducting element is a flexible metallic sheet which is attached, rather than unitarily formed as it seems to be in Ghela, to a fluid-conducting pipe system and is pre-stressed against the inner wall of the vacuum tube.

Thus, Takeuchi and Helmut, alone or in combination, do not teach or suggest each and every element as required by claim 9 and, thus, do not render the claim obvious. Ghela, which is asserted merely to teach the attachment of the heat-conducting element to the outer wall

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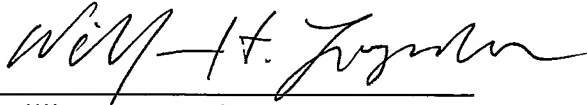
of the fluid-conducting pipe system, does not remedy this deficiency in Takeuchi and Helmut. Claims 15-18, which depend from claim 9 and further define the invention, are also not obvious for at least the same reasons.

Independent claim 19 has been added to highlight the above-noted distinctions between the claimed invention and the prior art of record. In particular, independent claim 19 requires the same structure of the solar collector as independent claim 9, but is recited in method form.

Based on the foregoing amendments and remarks, reconsideration of the rejections and allowance of claims 9 and 15-19 are respectfully requested.

Respectfully submitted,

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